



[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2014-0773; Directorate Identifier 2014-NM-068-AD; Amendment 39-18271; AD 2015-19-09]**

**RIN 2120-AA64**

**Airworthiness Directives; The Boeing Company Airplanes**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** We are adopting a new airworthiness directive (AD) for all The Boeing Company Model 787-8 airplanes. This AD was prompted by reports of a potential latent failure of the fuel shutoff valve actuator circuitry, which was not identified during actuator development. This AD requires replacing certain engine and auxiliary power unit (APU) fuel shutoff valve actuators with new actuators, and also requires revising the maintenance or inspection program to include a new airworthiness limitation into the Airworthiness Limitations Section (ALS) of the Instructions for Continued Airworthiness (ICA). We are issuing this AD to detect and correct latent failures of the fuel shutoff valve to the engine and auxiliary power unit (APU), which could result in the inability to shut off fuel to the engine and APU and, in case of certain fires, an uncontrollable fire that could lead to structural failure.

**DATES:** This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P. O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; Internet <https://www.myboeingfleet.com>. You may view this referenced service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221. It is also available on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2014-0773.

#### **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2014-0773; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (phone: 800-647-5527) is Docket Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

**FOR FURTHER INFORMATION CONTACT:** Rebel Nichols, Aerospace Engineer, Propulsion Branch, ANM-140S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6509; fax: 425-917-6590; email: [Rebel.Nichols@faa.gov](mailto:Rebel.Nichols@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Discussion**

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to all The Boeing Company Model 787-8 airplanes. The NPRM published in the Federal Register on November 17, 2014 (79 FR 68384). The NPRM was prompted by reports of a potential latent failure of the fuel shutoff valve actuator circuitry, which was not identified during actuator development. The NPRM proposed to require replacing certain engine and APU fuel shutoff valve actuators with new actuators, and also proposed revising the maintenance or inspection program to include a new airworthiness limitation into the ALS of the ICA. We are issuing this AD to detect and correct latent failures of the fuel shutoff valve to the engine and APU, which could result in the inability to shut off fuel to the engine and APU and, in case of certain fires, an uncontrollable fire that could lead to structural failure.

### **Record of Ex Parte Communication**

In preparation of AD actions such as NPRMs and immediately adopted rules, it is the practice of the FAA to obtain technical information and information on operational and economic impacts from design approval holders and aircraft operators. We discussed certain comments addressed in this final rule in a teleconference with Airlines for America (A4A) and other members of the aviation industry. All of the comments discussed during this teleconference that are relevant to this final rule are addressed in this final rule in response to comments submitted by other commenters. A discussion of this contact can be found in the rulemaking docket at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2014-0773.

### **Clarification of Certain Terminology**

Throughout the preamble of this final rule, commenters may have used the terms “fuel shutoff valve” and “fuel spar valve” interchangeably. Both terms refer to the same

part. In our responses to comments, we have used the term “fuel shutoff valve.” The term “fuel spar valve” is more commonly used in airplane maintenance documentation and, therefore, we have used that term in figure 1 to paragraph (g) of this AD.

## **Comments**

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the NPRM (79 FR 68384, November 17, 2014) and the FAA's response to each comment.

### **Request to Withdraw the NPRM (79 FR 68384, November 17, 2014)**

All Nippon Airways (ANA) stated that the NPRM (79 FR 68384, November 17, 2014) proposed a revision of the maintenance program or inspection program that added an inspection every 10 days. ANA explained that it believes this action is not necessary. ANA stated that it has used fuel shutoff valve actuators having part number (P/N) 53-0037 on its airplanes since their delivery, and that these fuel shutoff valve actuators have accumulated 1,607,870 flight hours. ANA stated that it has removed a total of 9 fuel shutoff valve actuators; however, it has never experienced a stuck micro-switch issue, and has experienced only a motor issue. ANA also stated that it has performed a one-time operational check on 10 airplanes with no findings.

We infer that the commenter requests that we withdraw the NPRM (79 FR 68384, November 17, 2014). We disagree with the commenter's request. We have determined that an unsafe condition exists that warrants an interim action until the modified actuator that will address the identified unsafe condition is installed. Boeing did not formally comment on whether it considers this issue to be an unsafe condition. We have determined that, without the required interim action, a significant number of flights with a fuel shutoff valve actuator that is failed latently in the open valve position will occur during the affected fleet life. With a failed fuel shutoff valve, if certain fire conditions were to occur, or if extreme engine or APU damage were to occur, or if an engine separation event were to occur during flight, the crew procedures for such an event would not stop the fuel flow to the engine strut and nacelle or APU. The continued flow of fuel could cause an uncontrolled fire or lead to a fuel exhaustion event.

The FAA regulations require all transport airplanes to be fail safe with respect to engine fire events, and the risk due to severe engine damage events be minimized.

Therefore, we require, for each flight, sufficiently operative fire safety systems so that fires can be detected and contained, and fuel to the engine strut and nacelle or APU can be shut off in the event of an engine or APU fire or severe damage.

The FAA airworthiness standards require remotely controlled powerplant valves to provide indications that the valves are in the commanded position. These indications allow the prompt detection and correction of valve failures. We do not allow dispatch with a known inoperative fuel shutoff valve. Therefore, we are proceeding with the final rule, not because of the higher-than-typical failure rate of the particular valve actuator involved, but instead because the fuel shutoff valve actuator can fail in a manner that also defeats the required valve position indication feature. That failure can lead to a large number of flights occurring on an airplane with a fuel shutoff valve actuator failed in the open position without the operator being aware of the failure. Airworthiness limitations containing required inspections are intended to limit the number of flights following latent failure of the fuel shutoff valve. Issuance of an AD is the appropriate method to correct the unsafe condition. We have not changed this final rule in this regard.

#### **Request to Extend the Test Interval for the Engine and APU Fuel Shutoff Valve Actuators**

ANA requested that we extend the test interval for the engine and APU fuel shutoff valve actuators from 10 days to 400 flight cycles. ANA stated it does not understand the reason why we proposed a test interval of 10 days, which ANA thinks is too short. ANA stated that, according to its removal data, the earliest actuator removal is at 467 flight hours and 442 flight cycles. ANA explained that the fuel shutoff valve operates only once (open-close) per one cycle; therefore, ANA proposed a test interval of 400 flight cycles, which would be below 442 flight cycles.

We disagree with the commenter's request to extend the test interval. An increase in the test interval from 10 days to 400 flight cycles would result in at least ten times as many flights at risk of an uncontrollable engine fire. Requiring the test at a 10-day interval has been deemed practical and is similar to inspections on other models that require maintenance action to test the actuator function. We have not changed this AD in this regard.

#### **Request to Revise Parts Installation Prohibition Paragraph**

ANA requested that we remove the restriction on installing a motor-operated valve actuator having P/N 53-0037 on crossfeed valve and defuel/isolation valve positions. ANA stated that actuator failure in these two positions does not lead to a structural failure or uncontrollable fire condition that is referenced in the unsafe condition.

We agree with the commenter's request. The vulnerability of the crossfeed system is not as significant as that of the engine/APU fuel feed system. We have revised paragraph (j) of this AD to limit the prohibition on installing a motor-operated valve actuator having P/N 53-0037 to the engine fuel shutoff valve and APU fuel shutoff valve.

#### **Request to Revise Service Information Identification**

Boeing requested that we correct a reference to unrelated service information specified in figure 1 to paragraph (g) of this AD.

We disagree with the commenter's request because the NPRM (79 FR 68384, November 17, 2014) identified the correct service information, i.e., Boeing Service Bulletin B787-81205-SB280015-00, Issue 002, dated June 19, 2014. We have not changed this AD in this regard.

#### **Conclusion**

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the

changes described previously, and minor editorial changes. We have determined that these minor changes:

- Are consistent with the intent that was proposed in the NPRM (79 FR 68384, November 17, 2014) for correcting the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM (79 FR 68384, November 17, 2014).

We also determined that these changes will not increase the economic burden on any operator or increase the scope of this AD.

#### **Related Service Information under 1 CFR part 51**

We reviewed Boeing Service Bulletin B787-81205-SB280015-00, Issue 002, dated June 19, 2014. The service information describes procedures for replacing the engine and APU fuel shutoff valve actuators. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section of this AD.

#### **Costs of Compliance**

We estimate that this AD affects 6 airplanes of U.S. registry.

We estimate the following costs to comply with this AD:

##### **Estimated costs**

<b>Action</b>	<b>Labor cost</b>	<b>Parts cost</b>	<b>Cost per product</b>	<b>Cost on U.S. operators</b>
Maintenance program revision	1 work-hour X \$85 per hour = \$85	\$0	\$85	\$510
Engine and APU fuel shutoff valve actuator replacement	10 work-hours X \$85 per hour = \$850	\$0	\$850	\$5,100

According to the manufacturer, some of the costs of this AD may be covered under warranty, thereby reducing the cost impact on affected individuals. We do not



control warranty coverage for affected individuals. As a result, we have included all available costs in our cost estimate.

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a "significant regulatory action" under Executive Order 12866,
- (2) Is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

## **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

### **Adoption of the Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

2015-19-09 **The Boeing Company**: Amendment 39-18271; Docket No. FAA-2014-0773; Directorate Identifier 2014-NM-068-AD.

#### **(a) Effective Date**

This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

None.

#### **(c) Applicability**

This AD applies to all The Boeing Company Model 787-8 airplanes, certificated in any category.

#### **(d) Subject**

Air Transport Association (ATA) of America Code 28, Fuel.

#### **(e) Unsafe Condition**

This AD was prompted by reports of a potential latent failure of the fuel shutoff valve actuator circuitry, which was not identified during actuator development. We are

issuing this AD to detect and correct latent failures of the fuel shutoff valve to the engine and auxiliary power unit (APU), which could result in the inability to shut off fuel to the engine and APU and, in case of certain fires, an uncontrollable fire that could lead to structural failure.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Maintenance or Inspection Program Revision**

Within 30 days after the effective date of this AD, revise the maintenance or inspection program, as applicable, to add Airworthiness Limitation (AWL) Number 28-AWL-ACT, "Engine and APU Fuel Shutoff Valve (Fuel Spar Valve) Actuator Test," by incorporating the information specified in figure 1 to paragraph (g) of this AD into the Airworthiness Limitations Section of the Instructions for Continued Airworthiness. This may be accomplished by inserting a copy of Airworthiness Limitation Number 28-AWL-ACT, "Engine and APU Fuel Shutoff Valve (Fuel Spar Valve) Actuator Test," into the maintenance or inspection program, as applicable. For the airplanes identified in the applicability note of Airworthiness Limitation Number 28-AWL-ACT, "Engine and APU Fuel Shutoff Valve (Fuel Spar Valve) Actuator Test," the initial compliance time for accomplishing the actions specified in figure 1 to paragraph (g) of this AD is within 10 days after accomplishment of the maintenance or inspection program revision, as applicable, required by this paragraph. When the engine and APU fuel shutoff valve actuators have been replaced as required by paragraph (i) of this AD, the Airworthiness Limitation Number 28-AWL-ACT, "Engine and APU Fuel Shutoff Valve (Fuel Spar Valve) Actuator Test," required by this paragraph may be removed from the maintenance or inspection program, as applicable.

**Figure 1 to Paragraph (g) of this AD: Engine and APU Fuel Shutoff Valve (Fuel Spar Valve) Actuator Test**

AWL Number	Task	Interval	Applicability	Description
28-AWL-ACT	ALI	10 DAYS	ALL	<p>Engine and APU Fuel Shutoff Valve (Fuel Spar Valve) Actuator Test</p> <p>Concern: The fuel spar valve actuator design can result in airplanes operating with a failed fuel spar valve actuator that is not reported. A latently failed fuel spar valve actuator would prevent fuel shutoff to an engine or APU. In the event of certain engine or APU fires, the potential exists for an engine or APU fire to be uncontrollable.</p> <p>Perform the following tests in accordance with Boeing Service Bulletin B787-81205-SB280015-00, Issue 002, dated June 19, 2014.</p> <ol style="list-style-type: none"> <li>1. Do PART 1: ENGINE FUEL SPAR VALVE ACTUATOR TEST as described in Boeing Service Bulletin B787-81205-SB280015-00, Issue 002, dated June 19, 2014. <ol style="list-style-type: none"> <li>a. If the left engine fuel spar valve actuator has part number 53-0037, perform the left engine fuel spar valve actuator test.</li> <li>b. If the right engine fuel spar valve actuator has part number 53-0037, perform the right engine fuel spar valve actuator test.</li> <li>c. If either test fails, repair faults as required (refer to Boeing Airplane Maintenance Manual 28-22-02).</li> </ol> </li> <li>2. Do PART 2: APU FUEL SPAR VALVE ACTUATOR TEST as described in Boeing Service Bulletin B787-81205-SB280015-00, Issue 002, dated June 19, 2014. <ol style="list-style-type: none"> <li>a. If the APU fuel spar valve actuator has part number 53-0037, perform the APU fuel spar valve actuator test.</li> <li>b. If the test fails, before further flight requiring APU availability, repair faults as required (refer to Boeing Airplane Maintenance</li> </ol> </li> </ol>

AWL Number	Task	Interval	Applicability	Description
				Manual 28-25-03).
				NOTE: Dispatch may be permitted per MMEL 28-25-03 if the APU is not required for flight.

**(h) No Alternative Actions and Intervals**

Except as specified in paragraph (i) of this AD: After accomplishment of the maintenance or inspection program revision required by paragraph (g) of this AD, no alternative actions (e.g., inspections) or intervals may be used unless the actions or intervals are approved as an alternative method of compliance (AMOC) in accordance with the procedures specified in paragraph (k) of this AD.

**(i) Replacement**

Within 36 months after the effective date of this AD, replace the engine and APU fuel shutoff valve actuators having part number (P/N) 53-0037 with P/N 53-0049, in accordance with Part 5 or Part 6, as applicable, of the Accomplishment Instructions of Boeing Service Bulletin B787-81205-SB280015-00, Issue 002, dated June 19, 2014. When all the engine and APU fuel shutoff valve actuators have been replaced as required by this paragraph, Airworthiness Limitation Number 28-AWL-ACT, “Engine and APU Spar Valve Actuator Test,” required by paragraph (g) of this AD may be removed from the maintenance or inspection program, as applicable.

**(j) Parts Installation Prohibition**

As of the effective date of this AD, no person may install on any airplane a motor-operated valve actuator having P/N 53-0037 in the engine or APU fuel shutoff valve location.

**(k) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, Seattle Aircraft Certification Office (ACO), FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the ACO, send it to the attention of the person identified in

paragraph (l) of this AD. Information may be emailed to:

9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(3) For service information that contains steps that are labeled as Required for Compliance (RC), the provisions of paragraphs (k)(3)(i) and (k)(3)(ii) apply.

(i) The steps labeled as RC, including substeps under an RC step and any figures identified in an RC step, must be done to comply with the AD. An AMOC is required for any deviations to RC steps, including substeps and identified figures.

(ii) Steps not labeled as RC may be deviated from using accepted methods in accordance with the operator's maintenance or inspection program without obtaining approval of an AMOC, provided the RC steps, including substeps and identified figures, can still be done as specified, and the airplane can be put back in an airworthy condition.

**(l) Related Information**

For more information about this AD, contact Rebel Nichols, Aerospace Engineer, Propulsion Branch, ANM-140S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6509; fax: 425-917-6590; email: Rebel.Nichols@faa.gov.

**(m) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Boeing Service Bulletin B787-81205-SB280015-00, Issue 002, dated June 19, 2014.

(ii) Reserved.

(3) For Boeing service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P. O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; Internet <https://www.myboeingfleet.com>.

(4) You may view this service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued in Renton, Washington, on September 15, 2015.

Michael Kaszycki,  
Acting Manager,  
Transport Airplane Directorate,  
Aircraft Certification Service.

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